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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/771,882	01/30/2001	Chuan-Bao Wang	00250	2679
23338	7590	01/11/2005	EXAMINER	
DENNISON, SCHULTZ, DOUGHERTY & MACDONALD 1727 KING STREET SUITE 105 ALEXANDRIA, VA 22314			SINES, BRIAN J	
			ART UNIT	PAPER NUMBER
			1743	

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/771,882

Applicant(s)

WANG ET AL.

Examiner

Brian J. Sines

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

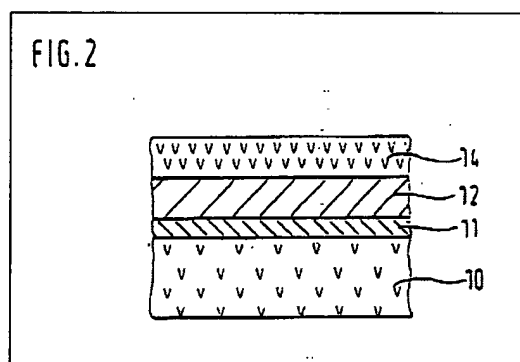
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1 – 4 and 6 – 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. (U.S. Pat. No. 4,246,228) in view of Friese et al. (U.S. Pat. No. 5,368,713 A).

Regarding claims 1 and 12, Jones et al. teach a combustible gas detection element comprising an electric heating element or filament (6) having a first coating layer, comprising a pellet with a precious metal oxidation catalyst supported on a porous oxide, such as zeolite; and a second coating layer overlaying the first coating layer, which acts as a molecular filter, wherein the second layer comprises a catalytic compound supported on a porous oxide comprising zeolite as well (see col. 1, line 1 – col. 2, line 28). Jones et al. do not specifically teach the incorporation of the coating layer structural configuration, which is adapted to function in the manner as recited by claim 1. Jones et al. do teach that around the pellet may be provided additional layers of

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catalytically active materials and/or an inactive non-catalytic porous material, the latter provided to act as a molecular filter (see col. 1, lines 45 – 51). However, Friese et al. teach a gas sensor comprising a porous ceramic coating comprised of at least two layers. The first layer (12) comprises a precious metal catalyst supported on a porous oxide; and a second layer (porous covering layer 14) overlaying the first layer, and comprising a catalytic compound, which is not substantially active towards combustible gases, but which provides sites reactive with and which are capable of trapping gases and vapors which poison the precious metal catalyst, wherein the catalytic compound being supported on a porous oxide (see figure 2). Friese et al. teach that the disclosed layer system has the advantage that the mixed oxides are able to trap the various contaminants usually occurring in exhaust gas, such as silicon, phosphorous, zinc or lead. The mixed oxide getters react with the contaminants from the exhaust gas to form reaction products. The high affinity of the alkali oxides for acidic oxides results in a beneficial gettering action with respect to silicon and phosphorous (see col. 1, lines 50 – 68). Friese et al. teach that, in addition to the mixed oxides, catalyst substances, in particular noble-metal catalysts, such as platinum, palladium, rhodium or others, can simultaneously be introduced into the porous covering layer (see col. 2, lines 4 – 23).



The cited prior art meet the three basic requirements to establish a *prima facie* case of obviousness (see MPEP § 2143). These three basic requirements are as follows: first, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; second, there must be a reasonable expectation of success; and third, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. The Courts have held that the teachings or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (see MPEP § 2143.01). The Courts have held that the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. See *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986) (see MPEP § 2143.02). The Courts have held that to establish *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. See *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974) (see MPEP § 2143.03).

Regarding the first requirement, Friese et al. do teach the trapping of contaminant compounds, e.g., silicon compounds, which are then converted into stable compounds, which do not impair the operation of the sensor (see col. 1, lines 1 – 29). Furthermore, the mixed oxide getters, according to the Friese et al. disclosure, react with the contaminants from the exhaust gas to form reaction products having high melting points above the maximum application temperature of the layer system (see col. 1, lines 50 – 68). Friese et al. teach that the sensors comprising their disclosed coating layer system are largely insensitive to contaminants from

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exhaust gases (see col. 2, lines 52 – 59). Regarding the second requirement, as evidenced by the disclosure of Friese et al., a person of ordinary skill in the art would accordingly have had a reasonable expectation of success of incorporating the coating layer system of Friese et al., with the gas sensor of Jones et al., in order to provide a gas sensor with improved performance characteristics when exposed to contaminants from exhaust gases. Regarding the third requirement, as indicated above, the teachings of Jones et al. in view of Friese et al. teach and suggest all of the claimed structural limitations, which incorporate the functional aspects of the first and second layers of the coating layer system, of the gas sensing element as recited in claim 1. Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate the coating layer system, as disclosed by Friese et al., with the gas sensing element of Jones et al., in order to provide a gas sensor with improved performance characteristics when exposed to contaminants from exhaust gases. Regarding claim 2, Jones et al. teach the use of catalytic compounds, which may consist of metal-loaded zeolites, such as zeolite incorporating palladium or platinum (see col. 1, lines 38 – 56). Regarding claim 3, Jones et al. teach the use of alumina as a ceramic carrier material (see col. 1, lines 38 – 44). Regarding claim 4, Jones et al. teach that the heating element (6) comprises a helical filament heater (see col. 2, lines 11 – 28; figure 1). Regarding claim 6, Jones et al. teach that the catalytic compound of the second coating layer is in solid form (see col. 1, lines 45 – 51). Regarding claim 7, Jones et al. teach that the catalytic compound, such as platinum and palladium, is in powder form (see col. 1, line 66 – col. 2, line 3). Regarding claim 8, Jones et al. teach the incorporation of additional layers (see col. 1, lines 45 – 51). Regarding claim 9, Jones et al. teach that the second layer effectively acts as a molecular filter external to the pellet (see col. 1, lines 45 – 51). Regarding claim 10, Jones et al.

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teach that the external filter layer is formed from a homogeneous mixture resulting in a one-piece, monolithic structure (see col. 1, lines 45 – 51). Regarding claim 11, Jones et al. teach that the second coating layer may comprise multiple layers comprising a precious metal catalyst, such as platinum or palladium, supported on a porous oxide comprising zeolite (see col. 1, lines 38 – 56). Regarding claim 12, Jones et al. teach the further incorporation of a compensating element (see col. 2, lines 29 – 62). Regarding claim 13, as shown in figure 2, Jones et al. teach an electrical circuit to which the sensing element and the compensating element are connected (see col. 2, lines 29 – 62). Regarding claim 14, as shown in figure 2, Jones et al. teach a balanced or wheatstone bridge circuit.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

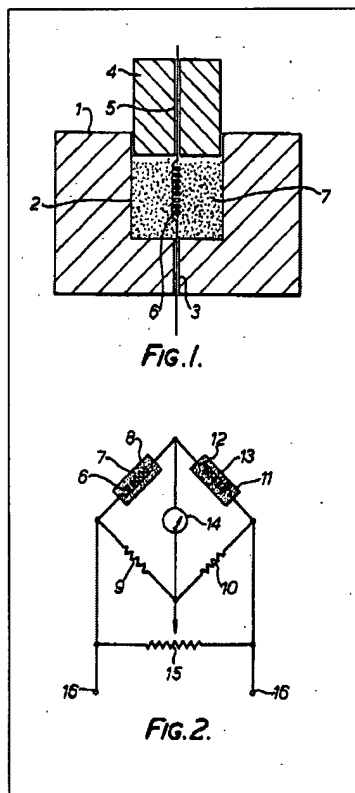
The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. and Friese et al., and further in view of Cheng et al. (U.S. Pat. No. 5,670,115). Jones et al. teach that

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the heating element (6) comprises a helical filament heater (see figures 1 & 2, col. 2, lines 11 – 28). Jones et al. and Friese et al. are silent to the specific teaching of incorporating a heating element comprising an electric film heater. Cheng et al. do teach the incorporation of an electric film heater (52) with a gas sensor (30) (see col. 7, lines 51 – 62; figure 5).



As evidenced by Jones et al. and Cheng et al., both of these heating elements are considered functional equivalents recognized in the prior art (see MPEP § 2144.06). The Courts have held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such a substitution obvious. See *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). Furthermore, the Courts have held that the change in form or shape is an obvious engineering design. See *In re Dailey*, 149 USPQ 47 (CCPA 1976). Therefore, it would have been obvious to one of ordinary skill in the art to incorporate an electric film heater,

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as taught by Cheng et al., with the gas detector, as taught by Jones et al. in view of Frieese et al., in order to provide more effective heating control to the sensor due to the difference in heat transfer properties afforded by the shape and surface area of the heater in the form of a film, rather than a helical wire configuration, depending upon the shape of the gas sensor.

Response to Arguments

Applicant's arguments filed 10/20/2004 have been fully considered but they are not persuasive.

The applicant essentially argues that a person of ordinary skill in the art would not have been motivated to modify the apparatus of Jones et al. by incorporating the teachings of Frieese et al. to provide for the applicants invention as claimed. In response to applicant's argument that the teachings of Frieese et al. and in combination with the teachings of Jones et al. are inappropriate for use in the claimed invention, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The Courts have held that “[a] reference is reasonably pertinent if, even though it may be in a different field of endeavor, it is one which, because of the subject matter with which it deals logically would have commended itself to an inventor’s attention in considering his problem.” See *In re Clay*, 23 USPQ2d 1058 (CAFC 1992); & *In re GPAC, Inc.*, 35 USPQ2d 1116 (Fed. Cir. 1995). If a reference disclosure relates to the same problem as that addressed by the claimed invention, “that fact supports use of that reference in an obviousness rejection. An

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inventor may well have been motivated to consider the reference when making his invention.”

Id. Regarding the Friese et al. reference, the applicant argues that the porous covering layer (12) does not contain a catalyst material. However, Friese et al. do unequivocally indicate that this layer may susceptible to containing a catalytic material. Friese et al. do teach that, in addition to the mixed oxides, catalyst substances, in particular noble-metal catalysts, such as platinum, palladium, rhodium or others, can simultaneously be introduced into the porous covering layer (12) (see col. 2, lines 4 – 23). Additionally, Jones et al. do teach that around the pellet of their disclosed apparatus may be provided additional layers of catalytically active materials and/or an inactive non-catalytic porous material, the latter provided to act as a molecular filter (see col. 1, lines 45 – 51). Both of the Friese et al. and Jones et al. references pertain to gas detection devices, which utilize catalytic materials for detection, and are susceptible to similar problems, such as fouling and poisoning. For example, Jones et al. teach that their gas detection device can be susceptible to catalyst poisoning by non-volatile residues, and therefore incorporates the use of an additional porous layer, which can act as a filter to mitigate the effects of these residues on detector performance (see col. 1, lines 30 – 37). Similarly, Friese et al. teach the incorporation of a porous layer comprising gettering agents for trapping contaminant gases to mitigate the effect of contaminants on detector performance (see col. 1, lines 50 – 68). Both of the detection devices, as disclosed by Friese et al. and Jones et al., utilize the same catalytic material, such as platinum or palladium, for example, for detection (see Friese et al.: col. 2, lines 4 – 23 & Jones et al.: col. 1, line 54 – col. 2, line 28). The Courts have held that the rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from the knowledge

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generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) (see MPEP § 2144). As evidenced by the teachings of Jones et al. and Friese et al., a person of ordinary skill in the art would have recognized the suitability of incorporating a layered configuration for a gas sensing device utilizing a catalytic material in order to provide for better performance, such as by the protective effects afforded by the incorporation of a gettering agent into a protective porous layer for trapping contaminant gases (see MPEP § 2144.07). Furthermore, as evidenced by Friese et al., a person of ordinary skill in the art would accordingly have had a reasonable expectation for success of incorporating such a layered structural configuration within a sensing apparatus. The Courts have held that the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. See *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986) (see MPEP § 2143.02). Therefore, it would have been obvious to a person of ordinary skill in the art to provide a layered system as taught by Jones et al. in view of Friese et al., to provide the layered structural configuration for the sensor as claimed in order to provide for better sensor performance when the sensor is in the presence of contaminant or residue gases that can harm the sensing element.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**


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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines, Ph.D. whose telephone number is (571) 272-1263. The examiner can normally be reached on Monday - Friday (11:30 AM - 8 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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Technology Center 1700